

WHAT IS CLAIMED IS:

*Sub A3*

1. A magnetic unit, comprising:
  - a first group of at least a first pair of permanent magnets comprising either ceramic magnets or ferrous magnets having like poles of said permanent magnets positioned adjacent an outer surface of each other;
  - a second group of at least a second pair of permanent magnets comprising either ceramic magnets or ferrous magnets having like poles of said permanent magnets positioned adjacent each other, said first and said second groups of said permanent magnets defining a channel therebetween;
  - at least a third pair of magnetically permeable members comprising malleable steel members, malleable iron members, or molded iron members, one of said third pair being respectively located between said adjacent surfaces of said pair of permanent magnets and located adjacent each outer surface of said pair of permanent magnets; and
  - means for securing said pair of magnetically permeable members and said pair of permanent magnets, thus to provide a magnetic unit which concentrates its magnetic flux through said malleable steel members at opposed locations in said channel;
  - at least a third permanent magnet located in said channel, a pole of said third magnet being positioned adjacent an opposite magnetic pole of said first pair of permanent magnetics at a surface of one of said magnetically permeable members, an opposite pole of said third magnet, thus to maintain a stable positional relationship by the magnetic effect of the relationship among said first, second, and third permanent magnets.
- 35 2. The magnetic unit as set forth in claim 1, wherein a malleable steel member is located between said

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permanent magnets forming said first and said second pairs of permanent magnets.

3. The magnetic unit as set forth in claim 1,  
5 further including a support member for supporting said third permanent magnet in said channel, said support member being secured to a second support member for a portion of said vehicle.

10 4. The magnetic unit as set forth in claim 1 further including at least a pair of said first and said second groups of said permanent magnet members forming a pair of said magnetic units, and an additional magnetically permeable member located between said pair 15 of said groups of said permanent magnet members.

20 5. The magnetic unit as set forth in claim 4 wherein said magnetically permeable members located at the outer surfaces of said permanent magnet members are generally L-shaped.

25 6. The magnetic unit as set forth in claim 4 wherein said magnetically permeable member located between said pair of said groups of said magnetic members is generally T-shaped.

30 7. The magnetic unit as set forth in claim 4, wherein one of said pair of said groups of said permanent magnets is mounted on a support member of a vehicle, and another of said pair of said groups of said permanent magnets is mounted on a support member of a structure adjacent said vehicle, whereby attraction or repulsion of said pair contributes to levitating said vehicle.

35 8. The magnetic unit as set forth in claim 7 wherein means are providing for controlling a gap between said magnetic units.

9. The magnetic unit as set forth in claim 8, wherein said means is a hydraulic unit which is microprocessor controlled.

5 *Subd.* 10. The magnetic unit as set forth in claim 9 wherein a sufficient plurality of said pairs of said groups of magnets are positioned along a right-of-way to cause a vehicle, such as a train, to be levitated for translational motion.

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11. A system for supporting train for traveling while levitated, comprising:

a first support member forming a portion of said train;

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a second support member for supporting said train,

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a first plurality of adjacently-spaced, generally vertically-aligned groups of permanent magnets comprising ceramic magnets or ferrous magnets placed in an elongated face-to-face relationship on each of said first and said second support members, said groups of said permanent magnets and being separated by magnetically permeable materials to focus lines of flux, said plurality of said groups being positioned to attract each other, said plurality of groups defining a channel therebetween; and

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a plurality of permanent magnets located in said channel with opposite magnetic poles facing poles on said first plurality of groups of magnetic members; and

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a third support member secured to said plurality of permanent magnets located in said channel and secured to said first support member.

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12. ~~The system as set forth in claim 11,~~  
wherein said first support member forms a generally U-shaped channel having inwardly-turned arm members with a

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~~surface thereon for securing a first group of said plurality of permanent magnetic units thereto;~~  
~~said second support member defines a surface about parallel to said surface on said inwardly-turned~~  
5 ~~arm member of said first support member for securing a second group of said plurality of said permanent magnetic units thereto, in an opposing relationship to said first group, the magnetic forces between said first and said second groups causing said train to levitate under the~~  
10 ~~control of said hydraulic means.~~

13. The system as set forth in claim 12, wherein said first and said second groups are arranged to attract one another.

15 *Subs* 14. The system as set forth in claim 12, further including a guide reference member secured to said second support member and projecting intermediate said channel.

20 13. A magnetic levitations system comprising:  
    at least a first pair of permanent magnets having like poles facing each other;  
    at least a second pair of permanent magnets  
25 having like poles facing each other and located at a distance from said first pair defining a channel;  
    at least one permanent magnet located in said channel having opposite magnetic poles respectively located adjacent opposite poles of said first and second  
30 pair of permanent magnets respectively;

    a first magnetically permeable member located between each of said first pair of permanent magnets and a second magnetically permeable member located between each of said second pair of permanent magnets, said  
35 magnetically permeable member being substantially in the shape of a "T" having a leg located between said permanent magnets and a head defining a magnetic pole

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like the poles of said permanent magnets between which  
said leg is located.